

L. O. Howard Promoted War Metaphors as a Rallying Cry for Economic Entomology¹

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Metaphors have helped economic entomologists describe their field to themselves and to others. One of the most influential of American entomologists, Leland O. Howard, paid a great deal of attention to the public perception of entomology in general and applied entomology in particular. For the first two thirds of his tenure as chief of entomology in the United States federal government, Howard stressed the economic and public health benefits of applied entomology. For the last third of his tenure as chief and during his retirement, he promoted military metaphors as a way for the public to understand the importance of entomology. Economic entomologists after Howard often quote him, which suggested that his metaphors struck a powerful chord.



This article considers metaphors used by Leland Ossian Howard, a leading American entomologist in the late 19th and early 20th centuries, as he labored to convince the public of the value of entomology. Howard's metaphors were important for he helped organize and define economic entomology in the United States. He headed federal entomology from 1894 to 1927, helped found the American Association of Economic Entomologists, served as secretary of the American Association for the Advancement of Science for 22 years, wrote a standard history of applied entomology, and published prolifically in the scientific and popular press (Howard 1930, 1933; Weber 1930; Dupree 1957; Mallis 1971; Dunlap 1980; Sawyer 1990; Sorenson 1995; Russell 1996). Two studies briefly have discussed Howard's use of military metaphors (Dunlap 1981: 37; Russell 1996), but much more of the story remains to be told.

ECONOMIC ENTOMOLOGISTS RELY ON MILITARY metaphors. They talk of natural enemies, pest attacks, plant defenses, pest invasions, armies of insects, insect allies, and fights against insects (Dunlap 1981; Russell 1989, 1996). They have used these metaphors not just to describe insects but to define their profession to themselves and the public. When the Entomological Society of America celebrated 100 years of official entomology in the United States in 1954, it chose "Fight Your Insect Enemies" as its slogan (Centennial Commemoration Committee, no date).

We can think of a number of reasons for the popularity of military metaphors. Similarity of behavior is one. Soldiers, predators,

and herbivores all use some sort of force while defending armies, prey, and plants try to fend off such attacks. We also have a long cultural tradition of using military metaphors to describe efforts of scientists to gain knowledge or control over nature (Merchant 1980, Nash 1982).

Individuals sometimes use military metaphors to emphasize the importance of their work. Journalists, public speakers, advertising agencies, and managers often open with a "hook" that ties the speaker's topic into interests of the audience. Metaphors play powerful roles in such efforts, for they awaken associations already in people's minds. If particular metaphors work, many individuals and whole professions may use them too (Brown 1992). Because Americans (like people elsewhere) place a high value on patriotism and national defense, military metaphors offer a powerful way to stress the importance of an endeavor and link it to national priorities. In the past few decades in the United States we have launched a war on poverty, a war on cancer, a war on drugs, and the "moral equivalent" of a war on inflation.

During his first two decades as chief of the Bureau of Entomology, Howard strove to boost public appreciation of entomology and to increase funding by framing insect problems as economic and public health issues. In his third decade in that position and during his retirement, he switched to military metaphors, describing humanity as locked in a war for survival with insects. In this war, he suggested, economic entomologists served as frontline troops. Howard's metaphors appealed to many economic entomologists, but they also drew fire from critics. One of the most influential was Rachel Carson, who helped catalyze the modern environmental movement by singling out the ideology of economic entomology as a threat to the welfare of people and nature alike.

Professional Status, Economics, and Public Health

Howard believed that insects were interesting and important, and that entomologists made important contributions to society, but felt that the public saw entomolo-

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gists as absurd, net-toting fellows engaged in trivial studies such as “the differentiation of species by the examination of the number of spines on the legs and the number of spots on the wings” (Howard 1919: 117). To change that impression, Howard publicized the biology and beauty of insects in the hope that Americans would develop a greater appreciation of these creatures (Howard 1901a).

More importantly, Howard showed how entomologists solved practical problems. He stressed the threats to health and livelihood posed by insects, and how economic entomologists protected the public from those threats. His overall goal was Herculean: as Howard put it in 1899, “the great and ultimate result of the labor of the biologist...will be to bring about the absolute control of all other life by man” (Howard 1899: 569).

Howard had a particular interest in bringing disease-bearing interests under control. He did considerable work on malaria mosquitoes and developed one of the first effective ways of controlling them: pouring kerosene on water in which mosquitoes bred. In 1901, he authored a treatise titled *Mosquitoes: How They Live; How They Carry Disease; How they Are Classified; How They May be Destroyed* (1901b).

As chief of the Bureau of Entomology of the United States Department of Agriculture, Howard learned that supplying scientific information would not necessarily convince Congress, interest groups, or the public to follow entomological advice. Efforts to pass a plant quarantine law made this lesson clear. Federal entomologists long had recognized that many insect pests came from other countries. In 1897, Howard estimated that thirty-six of the seventy-two most significant pests in the United States were imports; six more were suspected of being from other countries. Other pests, such as the Mediterranean fruit fly, *Ceratitidis capitata* (Wiedemann), threatened to enter at any time (Howard 1930, Mallis 1971).

In 1897, a convention of representatives from state agricultural and horticultural societies, Granges, agricultural colleges, experiment stations, and the United States Department of Agriculture called for a quarantine law. Nurserymen opposed the measure, however, and a bill to establish a plant quarantine service languished. It was only the combination of high-profile threats—including the spread of the gypsy moth, *Lymantria dispar* (L.), and the importation of Japanese cherry trees infested with pests—with four years of intensive lobbying by a member of the Bureau of Entomology, C. L. Marlatt, that led to the passage of a quarantine law in 1912. During the four year delay between the introduction of the bill and its passage, major

pests (e.g. European corn borer, *Ostrinia nubilalis* [Hübner]; Japanese beetle, *Popillia japonica* Newman; and Oriental fruit moth, *Grapholita molesta* [Busck]) entered the United States (Howard 1930, Mallis 1971, Pauly 1996).

Howard came to rely on what he called a “psychological approach,” which went beyond recitation of scientific “facts,” to persuade Congress. To ask for an appropriation to study the boll weevil, *Anthonomus grandis grandis* Boheman, then confined to Texas, Howard brought a two-foot-long papier mache model of a boll weevil in a box to the hearing. When he removed the model from the box, Congressman Lamb of Virginia turned to Congressman Burleson of Texas and exclaimed, “My God, Burleson, is it as big as that?” (Howard 1933: 67–69).

Along with using visual aids to influence Congress, Howard employed striking language to influence the public. In 1908, he proposed to the Committee of One Hundred on Public Health at the meeting of the American Association for the Advancement of Science that the house fly, *Musca domestica* L., be renamed the typhoid fly. Howard’s reasoning was simple: people “will fear and fight an insect bearing the name ‘typhoid fly’ when they will ignore one called the ‘house fly,’ which they have always considered a harmless insect” (Howard 1911: xvii).

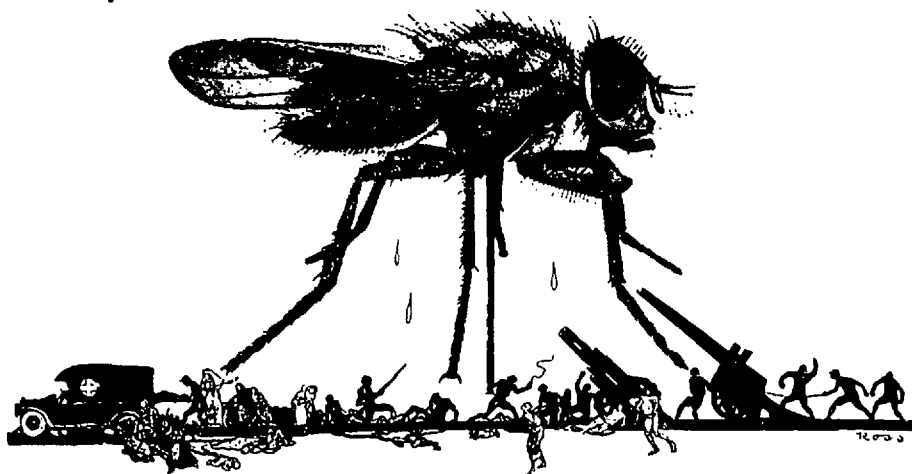
Howard was pleased by the wide newspaper coverage of the “typhoid fly” moniker during the national “Swat the Fly” campaign (Fig. 1). Several newspapers, including the *Minneapolis Tribune*, the *Kansas City Star*, the *Milwaukee Sentinel*, and the *Washington Evening Star*, took up the anti-fly cam-

paign in 1910. The American Civic Association prepared press clipping sheets, lantern slides, posters, and a moving picture film. Howard urged that children be targeted in this campaign because they were more malleable than adults (Howard 1911: 220–226).

Unfortunately for Howard, studies did not support his contention that flies transmitted typhoid in American cities. In 1908, the Bureau of Entomology joined with the Public Health and Marine Hospital Service to study the relationship between flies and typhoid in Washington, DC. They found none. A similar study by G. F. Sykes of Brown University came up with the same result. The *Journal of the American Medical Association* editorialized against Howard, saying that contamination of water and milk and contact with carriers were the most important means of civilian typhoid transmission. The journal urged “more scientific knowledge and less repetitious babble of sentiment in dealing with flies or any other nuisance” (Howard 1911: 141).

The lack of data did not deter Howard, and his rationale for “overstatement” revealed a great deal about his approach: “And there is the quandary: how to frighten the ignorant and slothful and educate them on the fly question without creating a distaste for your methods and a consequent lack of helpful interest on the part of some [scientific and medical personnel] who could be of the most valuable assistance. The writer, although he was trained to scientific methods and has followed them for many years, is inclined to think that over-statement to bring about a great sanitary reform may be justified so long as this overstatement is based

“The Fly Must be Exterminated to Make the World Safe for Habitation”



From the *St. Louis Post-Dispatch*

THE CITY OF ST. LOUIS IS CONDUCTING A VIGOROUS WARFARE AGAINST FLIES

Fig. 1. In 1918, the domestic campaign against the house fly adopted the rhetoric of World War I by playing on the phrase that the war in Europe would “make the world safe for democracy.” This cartoon appeared in the *St. Louis Post-Dispatch* (reprinted in *American City* 19 [July 1918]: 12).

upon sound circumstantial evidence" (Howard 1911: 229).

Military Metaphors

Up to 1917, Howard stressed mainly economic and public health threats posed by insects (Howard 1899, 1901b, 1911). The former was a standard argument used by economic entomologists to justify their work, and the latter fit well with Progressive era campaigns to improve public health in American cities.

The outbreak of war offered new opportunities to demonstrate the practical value of entomology. Howard and his colleagues conducted research on various entomological problems of concern to the armed forces (such as figuring out ways to kill lice, which transmitted typhus), and the army placed entomologists in charge of mosquito and fly control in some camps. Howard published a series of articles in professional and popular journals stressing that assisting in the war effort should dispel the notion that entomologists were eccentrics doing trivial work. As he put it, "war conditions have intensified the work of the entomologists and have enabled them to make the importance of their researches felt almost as never before" (Howard 1917a, b, 1919: 109).

During and shortly after World War I, Howard portrayed entomologists as allies of the armed forces. Then, in December 1921, in a speech as retiring president of the American Association for the Advancement of Science that he identified as a turning point in his public portrayal of insects, he employed the metaphor of entomologists as an army engaged with insects as his main theme. "The war of humanity against the class *Insecta*," Howard suggested, would be "the next great world war" (Howard 1921: 642; 1922, 1931a, b).

Howard's use of war metaphors tapped long traditions. In the Bible, according to Joel, God told His people that He would "restore to you the years which the swarming locust has eaten, the hopper, the destroyer, and the cutter, my great army, which I sent among you" (2: 25). One eyewitness to locust invasions on the Great Plains in the 1870s said the grasshoppers "moved as an army forty miles wide and a hundred and fifty miles long" (quoted in Atkins 1984: 17). Nineteenth century entomologist Benjamin Walsh criticized the priorities of the first head of entomology in the federal government, Townend Glover, by saying that Glover should have been "making war on the chinch-bug, the Hessian fly, and the curculio" instead of spending so much time on museum collections (quoted in Howard 1930: 40).

As Walsh's comment hinted, war metaphors offered a way to contrast applied entomology with other fields (such as taxonomy) and elevate the significance of practical insect problems. They also implied that the country needed to organize and mobilize itself against an insect threat, which would mean rallying behind well-organized entomologists and supplying them with the resources they needed to lead the fight.

One of Howard's colleagues, Stephen A. Forbes, used war metaphors to make these arguments a few years before Howard's 1921 speech. In 1915, Forbes said that economic entomology began in Illinois in 1867 with B. D. Walsh, who was "private, captain, colonel, adjutant, and major-general." Increased training of professional entomologists had increased the size of the entomological army. "Organized war against injurious insects is thus at last provided for in Illinois, and what we may fairly call a corporal's guard of trained and experienced fighters is now constantly in the field. Their enemies can scarcely be said to have diminished in number, however, during the last twenty-five years, for the insect invasion of the state is still in progress. New armies cross our borders at frequent intervals, and fresh uprisings occur every now and then, of those already in our midst" (Forbes 1915: 7, 9).

It seems likely that the Civil War, scientific traditions, and entomological experience combined to influence Forbes's rhetoric. As a young man, Forbes had enjoyed the excitement, sense of patriotic service, and time he spent outdoors while a Civil War soldier, and he credited his war experience with guiding him to a career in science. After the war, he joined the revolution in biological thinking that swept American universities in the 1870s when the ideas of Darwin, Agassiz, and Huxley helped kindle interest in evolution and competition in nature. Forbes served as professor of zoology and entomology at Illinois, Dean of the College of Science at Illinois, state entomologist of Illinois, president of the Entomological Society of America, and member of the National Academy of Sciences. He was the only man twice elected president of the American Society of Economic Entomologists (Howard 1932 in Forbes 1977: 3-4).

The outbreak of war in Europe brought added resonance to Forbes's war metaphors. In 1915, Forbes lamented the American public's inability to see similarities between human and insect foes. He noted that Americans would surely rise up against a human invasion but would not fight an insect that also was "a foreign enemy who had succeeded in completely overrunning" the country, including farms and homes. Forbes offered the San Jose scale, *Quadraspidiotus*

perniciosus (Comstock), as an example, calling it "a case of Japanese invasion far more successful, and probably more destructive also, than any which Japan could possibly make by means of dreadnoughts and armies of little brown men" (Forbes 1915: 6, 12).

Forbes summed up his argument in what would become one of the most-quoted passages in entomology (which makes it worth including at length): "The struggle between man and insects began long before the dawn of civilization, has continued without cessation to the present time, and will continue, no doubt, as long as the human race endures... We commonly think of ourselves as the lords and conquerors of nature, but insects had thoroughly mastered the world and taken full possession of it long before man began the attempt. They had, consequently, all the advantage of a possession of the field when the contest began, and they have disputed every step of our invasion of their original domain so persistently and so successfully that we can even yet scarcely flatter ourselves that we have gained any very important advantage over them. Here and there a truce has been declared, a treaty made, and even a partnership established, advantageous to both parties to the contract—as with the bees and silkworms, for example; but wherever their interests and ours are diametrically opposed, the war still goes on and neither side can claim a final victory" (Forbes 1915: 2).

Howard's 1921 speech echoed Forbes as well as the guns of the Great War. Howard's practice of rarely citing sources makes it hard to trace his intellectual debts, but he seemed to paraphrase Forbes in a passage that also became a favorite quotation among economic entomologists: "It is too much, perhaps, to hope that the lesson which the world has recently learned in the years 1914 to 1918 will be strong enough to prevent the recurrence of international war; but, at all events, there is a war, not among human beings, but between all humanity and certain forces that are arrayed against it. Man is the dominant type on this terrestrial body; he has overcome most opposing animate forces; he has subdued or turned to his own use nearly all kinds of living creatures. There still remain, however, the bacteria and protozoa that carry disease and the enormous forces of injurious insects which attack him from every point and which constitute today his greatest rivals in the control of nature. They threaten his life daily; they shorten his food supplies, both in his crops while they are growing and in such supplies after they are harvested and stored, in his meat animals, in his comfort, in his clothing, in his habitations, and in countless other ways... With all this in view, it will be necessary for the human species to

bring this great group of insects under control" (Howard 1921: 650–651).

That war would require "skilled biologists—thousands of them." The public believed that "*entomologist* is synonymous with everything futile and childish," Howard noted, but state entomological researchers were actually a "corps" and federal workers "a force of four hundred trained men." Together they were "an army" fighting a "defensive and offensive campaign" against insects. In this war, Howard predicted, three weapons from World War I would find wide use in conquering pests: chemical weapons, airplanes, and flame-throwers (Howard 1921: 647; 1922).

The speech drew public attention, and a flurry of newspaper and magazine articles on the insect menace followed. In May 1922, William Crowder authored an article in *Century Magazine* that could have been written by Howard. Crowder argued that an insect "menace" threatened the existence of the human race. "Every effort at domination or mastery [of insects] has been futile," he averred. Like Howard, Crowder called on science to solve this problem. "The Great War proved what can be accomplished in the field of science when concentrated and concerted energy is applied as the result of a powerful incentive...Henceforth this warfare between man and the insects is to be one of relentlessness and determination. It will be a warfare which knows no armistice. Man's civilization, his future, his very life, are at stake" (Crowder 1922: 142–143, 148).

In 1925, William Atherton Du Puy made similar arguments: "The issue is vital: no less than the life or death of the human race. If man wins he will remain the dominant species on this earth. If he loses he will be wiped out by this, his most ambitious racial enemy." Against this "insect menace" stood L. O. Howard and the Bureau of Entomology. Those scientists were "the staff officers, the intelligence corps of the thousand-year war." Those "General Staffs of this war...agree that the insects are gaining on man, that they threaten his very existence" (Du Puy 1925: 435, 440).

For the rest of his career, Howard elaborated on these themes and stated that he hoped they would increase public appreciation and funding for economic entomology (Howard 1922, 1926, 1931a). Following his retirement as chief of the Bureau of Entomology in 1927, Howard authored three books in which he emphasized the insect danger. In 1930, he authored a classic history of applied entomology in the United States. In 1931, he authored *The Insect Menace*, which combined a Darwinian belief in the struggle for survival, a Spencerian belief that struggle resulted in balance, and a

Malthusian belief that human beings would soon overrun their food supply. Howard's vision was dire: human beings were in danger of succumbing to "the dominance of the insect type in this world until nature strikes a new balance and evolves competitive types better fitted to maintain themselves than the human species will have shown itself to be" (1931a: 156–157). In 1933, Howard authored his autobiography with the revealing title *Fighting the Insects: The Story of an Entomologist*.

Impact and Reaction

Howard's rhetoric influenced the way economic entomologists described themselves and insects for decades. A member of the Bureau of Entomology, R. C. Roark, repeated the long passages (quoted above) from Forbes (1915) and Howard (1921) in a 1935 meeting of exterminators. Then he hinted at the combination of professional values, self interest, and altruism that made such rhetoric important: "People must be taught that insects are enemies of man; and as the public becomes insect conscious the opportunities for service by the entomologist, the insecticide chemist, the chemical manufacturer and the exterminator will increase" (Roark 1935: 117).

In 1954, the Entomological Society of America celebrated 100 years of official entomology in the United States by launching a national public relations campaign under the slogan "Fight Your Insect Enemies," only a slight modification of Howard's (1933) autobiography title. The campaign reached the public through newspapers, magazines, radio, television, pamphlets, open houses, and even a postage cancellation with the campaign slogan. The cover letter accompanying publicity materials began, "Few people in your public know what would happen if man's ceaseless war on insects was relaxed for even a month." The U. S. Department of Agriculture distributed a bulletin titled *Fighting our Insect Enemies: Achievements of Professional Entomology, 1854–1954* (Centennial Commemoration Committee no date). George C. Decker, president-elect of the Entomological Society of America, thought this theme exactly right. In a 1953 address to the society, he quoted L. O. Howard's view that "there was grave doubt as to which might be victorious" in this struggle between people and insects (Decker 1954: 36). Howard died in 1950, but his metaphor of human beings locked in warfare with insects lives on.

These dire visions struck some critics as exaggerated and resulting control measures (real or hypothetical) as excessive. Soon after Howard launched his "war on insects"

campaign, Franz Maidl of the Vienna Natural History Museum authored a newspaper article titled "Our Planet with No Insects—A Catastrophe which We Hope Will Never Occur." After listing benefits that insects brought to human beings, Maidl mused about what would happen if someone in the United States developed a method of controlling all insects. He decided the result would be catastrophic (Howard 1931a: 201).

Similar criticisms arose occasionally in the decades to come, usually from outside economic entomology. In 1935, Albert Dickman argued in *Scientific American* that economic entomologists had oversimplified and exaggerated the insect threat. He said that insects helped as well as hurt people and had little chance of annihilating human beings. Insect physiologist Vincent Dethier (1976) charged that insects did not pose an overwhelming threat to the human food supply in his book, *Man's Plague? Insects and Agriculture*. Integrated pest management advocate Robert van den Bosch (1978) took on what he called the "bug bomb" philosophy of chemical pest control in *The Pesticide Conspiracy*.

The best known criticism of economic entomology came from nature writer Rachel Carson, who helped catalyze the modern environmental movement with her 1962 best seller, *Silent Spring*. She ended her book with a harsh assessment: "The 'control of nature' is a phrase conceived in arrogance, born of the Neanderthal age of biology and philosophy, when it was supposed that nature exists for the convenience of man. The concepts and practices of applied entomology for the most part date from that Stone Age of science. It is our alarming misfortune that so primitive a science has armed itself with the most modern and terrible weapons, and that in turning them against the insects it has also turned them against the earth."

Perhaps *Silent Spring* resonated with the public because it acted as a mirror: it reflected and reversed the rhetoric that Howard and his associates had promoted for decades. Economic entomologists waged war on insects, Carson wrote, but "the chemical war is never won, and all life is caught in its violent crossfire." Carson had turned war metaphors back on economic entomologists themselves.

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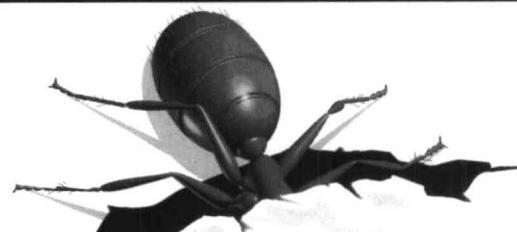
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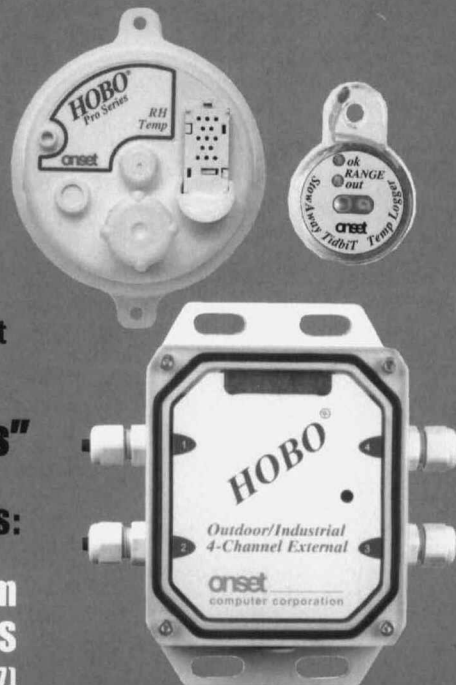
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